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Are your students safe to learn? The role of lecturer's authentic leadership on the creation of psychologically safe environments and their impact on academic performance

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Abstract

As the role of students and lecturers in higher education change, several questions emerge about the role of each of them on students' academic performance. This includes questions regarding the impact of the relationships between students, lecturer's characteristics and the social environment on students' performance. To address these questions this article reports a study of the impact of lecturer authentic leadership, psychological safety and network density on academic performance. It explores the relationship between network density, psychological safety and lecturer authentic leadership. A questionnaire was distributed to undergraduate students. A positive impact of lecturer authentic leadership and psychological safety on academic performance was found. Students from high-density groups tended to show better academic performance, higher psychological safety and tended to see their lecturers as being more authentic. A reflection on the role of the lecturer in higher education settings is presented. It also presents some recommendations on how student academic performance can be improved by the adoption of specific behaviours by their lecturer.

Keywords: business education, psychological safety, social networks, academic performance, network density, authentic leadership.

Psychological safety

The teaching and learning experience in higher education is changing. In the last years, we assisted a change from a purely lecture based teaching for a more participative approach. The engagement of students and staff effectively as partners in learning and teaching is one of the most important issues facing higher education today (Healy et al., 2014). In this scenario, self-regulated learning assumes especially importance on the learning and teaching process. Self-regulated learning can be defined as

'... self-generated thoughts, feelings, and actions that are planned and cyclically adapted to the attainment of personal goals' (Zimmerman, 2005 p.14). In this process of self-regulation, students not only set their goals but also choose the strategies to adopt and monitor the progress towards achieving those goals (Stefanou et al., 2013).

The interaction between external factors and student's pre-existing knowledge, their beliefs and values as well as interactions among and between students and between students and the lecturer have a crucial impact on the learning process (Stefanou et al., 2013). That is, the study of the importance of social relations in the learning process. In his seminal work, Bandura (1997) stressed the importance of the social context and the interaction with others in the learning process. The value of social learning is recognised by students as they tend to prefer a mix of traditional learning and cooperative learning tasks (Cavanagh, 2011). For this social interaction to occur it is important to promote a psychologically safe social context. Psychological safety can be defined as a 'feeling to be able to show and employ oneself without fear of negative consequences to self-image, status, or career' (Khan, 1990, p.708) The concept of team psychological safety can be seen as the perception of an individual that the group or team is safe to take the interpersonal risk (Edmondson, 1999). Both definitions have in common the fact that in social situations and environments individuals tend to protect their personal image in order to preserve their personal relationships.

There are four different types of interpersonal risks that individuals face when interacting with others: a) to be seen as ignorant when asking a question; b) to be seen as incompetent in general or in a specific task when admitting an error (or simply call attention to it), asking for help or accepting the probability of failing; c) to be catalogued as negative when criticizing past or present events; and d) to be seen as intrusive when asking for feedback (Edmondson, 2003).

Social processing theory advances with the idea that the social environment provides cues used by individuals to make sense of reality (Salancik and Pfeffer, 1978). The team/group members shared experiences will have an impact on the development of a shared psychological safety. When individuals are exposed to the same environment they will develop a shared meaning about reality (Edmondson, 1999). However, this approach ignores the importance of the individual experiences within and outside of the group. The importance of the key members in developing a group level psychological safety has been identified (Soares and Lopes, 2014). For example, the psychological safety of a member that most interacts with others in a group may influence the psychological safety of the entire group. A review found that psychological safety is an important variable at three levels: organisational, group and individual (Zhike, 2014). At the organisational level, this concept is an antecedent of organisational performance and organisational learning (Edmondson and Zhike, 2014). There is a positive relationship between high-quality relationships, psychological safety and learning from failures (Carmeli and Gittel, 2009). The explanation of this relationship may rely on the fact that when the individuals feel psychologically safe they are more willing to admit and discuss the error, ask for feedback and ask for help in solving it. Moreover, it is expected that they learn and share the knowledge by contacting with each other. According to this, it is expected in the educational context that by being more willing to discuss their errors or simply asking feedback, the students will develop a deeper knowledge influencing the quantity and quality of what they learn.

The study of psychological safety at the group/team level has been studied as an antecedent, outcome, mediator and moderator. Just like at the organisational level, also at the group level the concept of psychological safety has been viewed as positively related to team learning behaviours (for example, Edmondson, 1999; Choo et al., 2007) and with learning practices in teams (for example, Huang et al., 2008; Tucker et al., 2007). For instance, a study developed in the healthcare sector showed that psychological safety mediates the relationship between leadership and team learning behaviours in healthcare teams (Ortega et al., 2014).

Finally, at the individual level, psychological safety has been studied mainly as an antecedent of job engagement, organisational commitment, quality internal auditing, creative work environment and knowledge sharing (Edmondson and Zhike, 2014). Despite the fact that there are just a few studies about learning behaviours in the educational context, there is evidence that psychological safety increases the motivation for knowledge sharing between individuals (Siemsen et al., 2009). Based on this, it is expected that if students feel psychologically safe they will be more motivated to share the knowledge with colleagues contributing for their and their own academic performance. Psychological safety plays an important role in academic performance by providing a social environment in which

students feel free to share knowledge, ask questions and for feedback and discuss their performance. Considering the types of interpersonal risks presented, a student with low psychological safety will avoid behaviours that may be important for their academic performance such as asking questions, asking for help, asking for feedback, admitting any error and criticising past or present events. Based on this, the following hypothesis is presented:

Hypothesis 1: Psychological safety has a positive impact on academic performance.

Authentic leadership

Authenticity implies that 'one acts in accord with the true self, expressing oneself in ways that are consistent with inner thoughts and feelings' (Harter, 2002, 382). This concept contrasts with false self which implies that one hides the true self and their acts are contradictory with it. It is important to note that acting differently in different relational contexts does not necessarily constitute a lack of authenticity (Harter, 2002). For example, it is not expected from a lecturer exactly the same behaviour in the classroom that they have when they are with their family or friends. In turn, authentic leadership is 'a process that draws from both positive psychological capacities and a highly developed organisational context, which results in both greater self-awareness and self-regulated positive behaviours on the part of leaders and associates, fostering positive development' (Luthans and Avolio, 2003: 243). In other words, authentic leaders are aware of their feelings, thoughts, emotions, needs, preferences and beliefs, and act according to those.

Most literature considers authentic leadership as composed of four dimensions: self-awareness, relational transparency, balanced processing, and internalised moral perspective (for example, Hinojosa et al., 2014). Self-awareness refers to being aware of their strengths and weaknesses, traits characteristics, and emotions (Kernis, 2003). Self-awareness is gained in the contact with others and includes the awareness on how a leader's actions have an impact on others. It is then expected that individuals with high self-awareness seek feedback, know when it is time to re-evaluate their position and are aware of how others view their capabilities. For example, a lecturer with high self-awareness will be more aware of students' reaction when they are teaching, allowing them to correct their language style if needed.

Relational transparency involves showing to others the true self including both the good and the bad side. According to Kernis (2003, 15), 'authentic relations involve a selective process of self-disclosure and the development of mutual intimacy and trust'. Therefore, a lecturer with high relational transparency say exactly what they mean, admit mistakes and show a consistency between the emotions they are feeling and the ones they display. This component will allow, for example, the lecturer to admit an error when it occurs having the chance to correct it. By saying exactly what they mean, lecturers with high relational transparency will display a clearer communication what may improve the students' understanding of the message they want to communicate.

Balanced processing refers to leaders that make decisions based on data. Ilies et al. (2005) used the term unbiased processing when referring to this concept. Leaders who exhibited unbiased processing will show integrity and character what will influence their behaviours. Thus they do not deny, distort, exaggerate or ignore private knowledge, internal experiences and externally based evaluative information (Kernis, 2003). This concept assumes that all individuals are subjected to bias and flaws when processing information and that one of the characteristics of authentic leaders is to avoid this by listening to different points of view before coming to a conclusion. Therefore, lecturers with high balanced processing engage the students and use them as sources of information for decision making. By doing so they choose their teaching styles, classroom dynamics and other important features for student experience taking into account the perspective of their students. This may contribute to students' academic performance.

Finally, internalised moral perspective refers to a self-regulation guided more by moral standards and values than by group, organisational, or societal pressures. So the behaviours of the leader resulted from the decision-making process, are consistent with their internalised values (Gardner et al., 2005). Others (for example, Kernis, 2003; Ilies et al., 2005) call it simply authentic behaviours/actions. This does not mean however that the leader cannot adapt their behaviours to the circumstances. In fact, internalised moral perspective is deeply connected to self-awareness, once authentic leaders have to

be aware of the impact of their choices on others but without losing authenticity in their actions/behaviours.

It is also conceptually plausible to consider authentic leadership as a core construct (Rego et al., 2009). This is supported by evidence showing that the variance imputable to overall authentic leadership is more important than the one imputable to each individual constructs (for example, Kernis and Goldman, 2005). Based on the above, authentic lecturers will be the ones that are aware of the reactions of the students to their behaviours, will engage them in finding the appropriate pedagogic strategies and will use a clear communication by saying exactly what they mean. By doing so they will be more effective in sharing knowledge, answering students' questions and will provide support whenever they need it. Thus we suggest the following hypothesis is put forward:

Hypothesis 2: Authentic lecturers have a positive impact on the academic performance of their learners/students.

Density, academic performance, psychological safety and authentic lecturers

'A network consists of a set of actors or nodes along with a set of ties of a specified type (such as friendship) that link them' (Borgatti and Halgin, 2011, 2). In its simplest format in network theory usually, the actors are graphically represented by dots and the ties by edges. The ties may represent many different types of relationship such as friendship, communication, participation in the same events, etc. Communication networks are here considered to comprise three different types of communication content: problem-solving, decision-making and personal life.

The literature on the use of collaborative work in higher education has focused mainly on formal groups created to develop specific tasks assigned by the lecturer. Soetanto and MacDonald (2017) compared the emergence of obstacles and difficulties between the groups created by the lecturer vs self-created groups. However, the collaboration between students might not only occur in formal groups but also as a result of the informal relations that students establish among them. Social network analysis might be a powerful tool to study those informal relations. Social network analysis allows the analysis of both individual attributes (for example, preferences, skills, abilities, etcetera) and social structures,for example, information flow within a group/team (Robins and Kremer, 2010). Therefore, social network analysis may be a useful tool to investigate relations in organisations and groups. Teaching classes as groups means that individuals establish many different types of connections (for example, friendship, communication, etcetera) and have academic success as the main objective. Using social network analysis may give a meaningful insight about how the interactions between members influence their academic performance.

Social networks (that is, network density) and individual psychological states (that is, psychological safety and perceptions of authentic leadership) are mutually influential and contribute to the academic performance of students. Social networks may be analysed considering many different measures mainly at four levels: actor level, that is, individual level; dyadic and triad level, that is, between two or three members of a network; subgroups level, that is, cohesive subgroups within a broader network; and at the entire network level. Network density, as a cohesion measure, refers to the degree of connectivity within a network and is measured by the ratio of the number of actual ties in a network divided by the number of all possible ties (Borgatti et al., 2013). For example, when students attend the first teaching session probably nobody knows each other, which means that in the first moment the network density is null. However, it is normal that after some weeks the students had the opportunity to interact with each other increasing the density of the network.

Density has a positive effect on knowledge transfer by influencing the motivation of the members of the group to transfer knowledge between them (Reagans and McEvily, 2003). At the educational level, this means that students from dense cohorts will be more willing to share knowledge with colleagues what will contribute to their academic performance. Additionally, by interacting with each other students will have the chance to ask for help to solve problems or make decisions related to the module what can also lead to a better academic performance. Thus, we advance the following hypothesis:

Hypothesis 3: Network density is positively related to academic performance.

Members of highly interconnected networks tend to share tastes, outlooks, and other features, that can be transmitted through the network once their contacts also interact with each other (McPherson et al., 1992). Moreover, a denser network provides redundant information to the members, which may contribute to the emergence of a shared vision of the environment (Soares and Lopes, 2014). A positive relationship between network density and psychological safety in friendship networks was found (Shulte and Klein, 2010). Network density and psychological safety coevolve, which means that groups with higher density tend to have higher values of psychological safety and vice-versa. For example, if students feel that the class is safe for them to assume interpersonal risk so they will tend to communicate more often and freely with their colleagues. At the same time by contacting more often with their colleagues the students will develop trust within the group what may lead to a higher feeling of psychological safety. According to this, the following hypothesis is advanced:

Hypothesis 4: Network density is positively related to students' psychological safety.

Authentic leaders encourage sharing and partnership based on recognition and interdependence in relationships by nurturing, inspiring and empowering their followers (Bhindin and Duignan, 1997). Authentic leaders create environments in which authentic conversations are encouraged, which will facilitate learning of individuals and groups (Mazutis and Slawinski, 2007). Therefore, authentic lecturers will create an environment within and outside of the classroom that encourages the students to interact with each other and sharing knowledge. It is then expected that authentic lecturers will contribute to classes characterised by open communication between students, that is, to high-density classes.

Members that are more interconnected tend to share meanings about the social environment (McPherson et al., 1992). This means that a denser network will contribute to the emergence of shared meaning about the lecturers, namely in terms of authentic leadership. According to this, it is expected that students from high-density classes will see their lecturers as being more authentic than individuals from groups with low density through two interdependent processes: influence of authentic lecturers on density and influence of density on the development of a shared perception about the lecturers. In other words, students will interact more with each other when they see their lecturers as being authentic and at the same time will share that perception with others with whom they contact. Based on this the following hypothesis is presented:

Hypothesis 5: The density level of a network is positively related to lecturer authentic leadership.

A conceptual model of the influence of lecturers' authentic leadership, network density and psychological safety on academic performance is presented (Figure 1). According to this model, a positive influence of authentic leadership, network density and psychology on academic performance is expected. It is also expected that network density influences and is influenced by both by authentic leadership and psychological safety.

INSERT FIGURE 1 ABOUT HERE

Method

Sample and procedures

Participants in this study were 199 undergraduate students from different modules and courses studying in a business higher education institution in Portugal. The students belong to 13 different classes and each class had a different lecturer. 58 percent were female, and the average age was 23 (SD = 5.71). 30.3 percent were students from the first year, 47 percent from the second year and the remaining 22.7 percent were from the third year.

After obtaining permission from the board of the institution we approached the module leaders/lecturers to schedule the data collection between January and July 2014. We conducted a longitudinal study with two moments of data collection. In the first moment, the students filled a questionnaire about psychological safety and about authentic leadership. The first moment of data collection took place between seven and nine weeks after the beginning of the module and between five and seven weeks before the teaching assessment. In the second moment, tutors were asked to send the students' marks

to the researchers. Only the marks of the first attempt were used. The resit marks were not considered to avoid different conditions on students' assessments (for example, students that re-sat had more time to study). We were not able to guarantee the anonymity of the responses. However, all the participants were informed of this fact and advised that all the data was confidential.

Measures

Psychological Safety. A modified version of the original team psychological safety developed by Edmondson (1999) was used. The original scale is composed of seven items. However, considering the measures used by others to measure psychological safety three more items were added, which resulted in a final 10 item scale. We also replaced the word 'team', as originally used by Edmondson, with the word 'class' to adapt the instrument to the educational context. In doing so, we preserved the theoretical meaning of the assessed construct.

Sample items are: ''If you make a mistake in this organisation, it is often held against you (reverse scored item)'', ''It is safe to take a risk in this organisation'', and ''No one in this organisation would deliberately act in a way that would undermine my efforts''. Items were all anchored on a seven-point scale ranging from 1 strongly disagree to 7 strongly agree. The Cronbach's alpha for this measure was .66. Hence, this scale has an acceptable internal consistency.

Authentic leadership. We used a modified version of the 16 five-point items of Authentic Leadership Questionnaire (Copyright 2007 Authentic Leadership Questionnaire (POQ) by Avolio BJ, Gardner WL and Walumbwa FO. Published by Mind Garden, Inc. www.mindgarden.com). This instrument was modified from the original for measuring lecturer's authentic leadership. The modifications of the instrument consisted of the exchange of the term 'leader' by the expression 'this module lecturer'.

In this questionnaire, the individuals were asked to report the frequency (from 0: 'not at all' to 4: 'frequently, if not always') with which their tutors adopt 16 behaviours/attitudes). Sample items are: 'demonstrate beliefs that are consistent with actions', 'demonstrate beliefs that are consistent with actions', 'listen carefully to different points of view before coming to conclusions' and 'seeks feedback to improve interactions with others'.

Density Measurement. Density measure was collected by asking participants to nominate up to 5 same-class colleagues enrolled in a specific module whom they would turn to 1) talk about their personal life (personal life network); 2) ask advice for decision making related to the module (decision-making network); and 3) ask advice for problem-solving related to the module (problem-solving network). After collecting the data the density of each class and network was calculated using the software UCINET 6 for Windows (Borgatti et al.,2002). After getting all density values the classes were divided into high-density and low-density classes according to if they had a density higher or lower than the overall density means for each type of network (personal life, decision-making and problem-solving).

Academic Performance. The students' official grades of modules in which data collection took place were used. Grades were expressed on a scale between 0 and 20 and students fail the module with a mark below 9.5. Students have several attempts in different moments after the end of the module. However, only the grades of the first attempt were used to avoid differences in the assessment circumstances within the same class (for example, different assessment methods, students learning with the first attempt, more time to study, etcetera).

Data analysis strategy

To test the hypothesis related to the influence of psychological safety and authentic leadership on academic performance (H1, H2) two different models were tested through two different regression analysis, using the student grade as the criteria variable. Lecturer authentic leadership and psychological safety were regressors. In the first regression, psychological safety was used as a regressor and academic performance as the dependent variable and in the second regression authentic leadership was used as regressor and academic performance as dependent variable. Two independent samples t-test has been used to test the differences in academic performance, psychological safety and authentic leadership between high-density and low-density networks for the three different types of networks (problem-solving, decision making and personal life).

Results

It was hypothesised (H1) that psychological safety has a positive impact on academic performance. The results show a significant influence of psychological safety on academic performance (β=1.44, p<.05), supporting this hypothesis.

The second hypothesis (H2) was that authentic lecturers have a positive impact on the academic performance of their learners/students. Again, the results reveal that authentic leadership was a significant predictor of academic performance (β=3.1, p<.01), supporting this hypothesis.

INSERT TABLE 1 ABOUT HERE

The hypothesis that network density is positively related to academic performance (H3) was tested in the three different networks: problem-solving, personal life and decision making.

Regarding the problem-solving network, results show that academic performance differed between low-density group (M= 5.53, SD= 6.04, n= 110) and high-density group (M= 10.60, SD= 4.85, n= 89) at a .01 level of significance (t= -6.56, df= 196.00, p< .01, CI for mean differences -6.59 to -3.54). On average individuals from the group of high-density tended to have better academic performance than individuals from low density in problem-solving networks, what is consistent with the hypothesis.

The results within personal life network shows that academic performance differed between low density group (M= 5.84, SD= 6.07, n= 125) and high-density group (M= 10.93, SD= 4.65, n=74) at a .01 level of significance (t=-6.515, df=184.20, p<.01, CI for mean differences -60.51 to -3.48). Therefore, just like in the problem-solving network, the results support the hypothesis.

The results show that academic performance significantly differed between low-density group (M= 6.66, SD= 6.26, n=115) and high-density group (M= 9.41, SD= 5.50, n= 83) at a .01 level of significance (t=-3.27, df=188.41, p>.05, CI for mean differences -4.40 to -1.09) in the decision making network. Once again, these results support the hypothesis.

INSERT TABLE 2 ABOUT HERE

The hypothesis that the network density is positively related to students' psychological safety (H4) was also tested in the three different networks: problem-solving, personal life and decision-making.

The results of problem-solving network show that mean psychological safety differed between low density group (M= 5.22, SD= .70, n= 110) and high-density group (M= 5.50, SD= .69, n= 89) at a .01 level of significance (t= -3.00, df= 189.53, p< .01, CI for mean differences -.49 to -.10). On average individuals from the group of high density tended to have a higher psychological safety. Therefore, these results support the hypothesis.

The results of personal life network show that mean psychological safety differed between low-density group (M= 5.22, SD= .68, n= 125) and high-density group (M= 5.58, SD= .69, n=74) at a .01 level of significance (t=-3.484, df=151.56, p<.01, CI for mean differences -.55 to -.15). In this case, just like in the problem-solving, the individuals from the group with higher density showed a higher level of psychological safety, which supports the hypothesis.

In contrast, results show that mean psychological safety did not significantly differ between low density group (M= 5.33, SD= .700, n=115) and high-density group (M= 5.39, SD= .72, n= 83) at a .05 level of significance (t=-.59, df=174.532, p>.05, CI for mean differences -.26 to -.14). This means that contrary to what happened in the problem solving and personal life networks, there were no significant differences in the average psychological safety between individuals from the group of high density and the group of low density in the decision-making network. Thus, the results did not support the hypothesis in the decision-making network.

INSERT TABLE 3 ABOUT HERE

Finally, the hypothesis that the density level of a network is positively related to the lecturer authentic leadership (H5) was tested in the three networks: problem-solving, personal life and decision making.

Regarding the problem-solving network, results show that mean authentic leadership differed between low density group (M= 2.71, SD= .71, n=110) and high-density group (M= 3.09, SD= .46, n=89) at a .01 level of significance (t= -4.34, df= 197, p< .01, CI for mean differences -.55 to -.21). Thus, the members from groups with high density in the network of problem-solving tended to see their lecturer as being more authentic than the individuals from low-density ones. These results support the hypothesis for the problem-solving network

Results show that in the personal life network mean authentic leadership differed between low density group (M= 2.67, SD= .69, n=115) and high-density group (M= 3.18, SD= .40, n=83) at a .01 level of significance (t= -5.91, df= 196, p< .01, CI for mean differences -.67 to -.33). Therefore, we may conclude that members from high density in the network of decision making tended to see the lecturer as being more authentic than the individuals from low-density groups. These results support the hypothesis for the personal life network.

The results show that mean authentic leadership differed between low density group (M=2.72, SD= .69, n=125) and high-density group (M= 3.16, SD= .41, n= 74) at a .01 level of significance (t= -5.07, df= 197; p<0.01, CI for mean differences -.62 to -.27) in the decision-making network. This means that the individuals from high-density groups saw the lecturer as being more authentic than the individuals from low-density groups. These results support the hypothesis in the decision-making network.

INSERT TABLE 4 ABOUT HERE

Discussion

The study described in this article explored the impact of lecturer authentic leadership, psychological safety and network density on academic performance and also explored the relationship between network density, psychological safety and authentic leadership. Findings were presented at four levels: impact on psychological safety and authentic leadership on academic performance, the academic performance in high and low-density networks, the psychological safety in high and low-density networks and the lecturer authentic leadership in high and low-density networks.

Firstly, results suggest that both psychological safety and lecturer authentic leadership have a positive impact on academic performance. These results evidence the importance of having a social environment where students feel free to make questions, discuss their doubts and ask for feedback without fearing negative consequences. Despite the difference between organisational and educational context, this is consistent with the literature on learning behaviours in organisations (for example, Edmondson, 1999; Carmeli, 2007; Choo and Linderman, 2007).

It is also important, for academic performance, that lecturers assume a clear communication by saying exactly what they mean, engage the students in finding the appropriate pedagogic strategy and be aware of the reactions of students to their behaviour. This influence of lecturer authentic leadership may occur due to two main reasons. Firstly, by assuming clear communication lecturers will improve the students' understanding of what is being said. Secondly, by being aware of the reactions of students and engaging them in finding appropriate pedagogic strategies lecturers will not only be able to adopt the most appropriate behaviour but will also contribute to the students' perception that they are truly concerned with their learning experience and academic performance. This image may contribute to a greater engagement from the students, contributing to their academic performance.

Secondly, results showed that academic performance is better in high-density networks than in low-density networks in all networks studied. This means that when there is a high portion of interactions

between students for advice in terms of decision-making and problem-solving and also to talk about their personal life they tend to have better grades. An explanation for these results may be the fact that by seeking advice from others in terms of decision-making and problem-solving students will be equipped with more knowledge and will have the chance to see their doubts clarified. Additionally, just as mentioned by Bandura (1997) the interaction with others may have an impact on students' motivation and in their self-efficacy.

A high density in personal life may indicate that group members trust each other and have positive relationships, which may contribute towards a more positive social environment. The results are consistent with the idea that social cohesion influences the motivation of group members to transfer knowledge between them (Reagans and McEvily, 2003). On the other hand, the academic performance is affected not only by issues related directly to the module but also by personal life issues. For example, if for a personal reason a student is absent for a long period they may be affected in terms of academic performance. In this case, by talking with other colleagues about their personal life, they may get help to overcome the consequences of being absent.

Thirdly, results showed that students from high-density networks tend to have higher psychological safety than the ones from low-density networks, but only for problem-solving and decision-making networks. One explanation for these results may be the fact that psychological safety enables the interaction between members, once the social environment is safe for them to assume the interpersonal risk. In turn, it is expected that by interacting with each other the students will develop trust and consequently psychological safety. Therefore, this may be faced as a two-way process, that is, psychological safety influences density and density influences psychological safety.

The results of personal-life networks contradict the conclusions presented in the literature (for example, Schulte and Klein, 2010). The differences of the results may be explained by the contextual differences. In the study presented here, the two first networks - problem-solving and decision-making - were directly related to the module but the network about personal life may have been seen by the participants as unrelated with the module. Furthermore, the studies about the relationship between density and psychological safety did not focus on the educational context.

Finally, the results showed that members from high-density groups tend to see their lecturers as being more authentic than those from low-density groups in all three networks analysed. Just like the results of the relationship between density and psychological safety also theses ones can be explained by two simultaneous processes. First, by encouraging knowledge sharing and partnership (Bhindin and Duignan, 1997) authentic lecturers will influence the interactions between team members contributing for group density. For example, it is expected that an authentic lecturer stimulates discussion in the classroom contributing directly to increase the number of interactions between students. At the same time, members that are more interconnected tend to share meanings about the social environment (McPherson et al., 1992). This means that the perceptions of authentic leadership will be shared among the group through the interaction between students, what may explain the high values of lecturer authentic leadership among individuals from high-density groups.

There are both theoretical and practical implications. At the theoretical level, there are important clues about the role of group dynamics and interpersonal relationships for the academic performance of higher education students. It seems plausible to think that both the lecturer behavioural choices and the relationship between students may influence the academic performance and to influence each other. We also extended the study of authentic leadership to the educational context advancing with the idea that this feature is an important factor for the teaching and learning experience. Finally, there is a contribution to the integration of psychological and social networks concepts.

At the practical level, this study may help lecturers and academic leaders to understand how they can improve academic performance by developing an authentic leadership style. Thus, institutions may include in their training plans programmes related to the development of authentic skills for lecturers. This article may help lecturers to understand the importance of promoting a psychologically safe environment inside and outside the classroom. Finally, by being aware of the importance of relationships between students for their academic performance lecturers may develop initiatives inside and outside the classroom to promote the cohesion within the group.

Just like all studies, this one is not free of limitations. First, the nature of the module and type of assessment was not considered. For instance, a module based on seminars may require more interaction and a more psychological safe environment than a module based on lectures. Also, a module in which the assessment is based on group coursework may require more interaction between students and a higher psychological safety, especially within the coursework subgroups, than an assessment based on an examination. The lack of anonymity required when using social network analysis might also have an influence considering that the students have been asked to answer questions about their lecturers. Finally, there are other variables that have not been considered in this study that might have an influence on the results, such as discipline the students are studying, the institution, country and level (undergraduate vs postgraduates).

For future studies, it is important to go deeper into the study of the relationship between network density, psychological safety, lecturer authentic leadership and academic performance, by studying, for example, causal effects and/or mediation/moderation effects. It is also important to study the influence of other variables in these relationships, such as the nature of the modules, the type of assessment and the dimension of the group. It is also important to replicate the study in different countries and make a comparison, as the culture might influence the results. It is also important to increase the sample, especially considering that this study also considers the class as a level of analysis and therefore it is important to have a larger number of classes.

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Table 1. Simple linear regression models of authentic leadership, psychological safety and authentic leadership dimensions (n=199).

DV= academic performance		
	(1)	**(2)**
Constant	0.10	-1.14
Psychological Safety	1.44*	
Authentic Leadership		3.1**
Adjusted R-squared	.02	.11

*p<.05; **p<.01

Table 2. Comparison of the academic performance means between high and low-density networks

	Density	N	M	SD	SEM
AcadPerform (Problem Solv)	Low	110	5.53	6.04	.576
	High	89	10.60	4.85	.514
AcadPerform (Decision)	Low	115	6.66	6.26	.583
	High	83	9.41	5.50	.604
AcadPerform (Personal Life)	Low	125	5.84	6.07	.543
	High	74	10.93	4.65	.541

Table 3. Comparison of the psychological safety means between high and low-density networks

	Density	N	M	SD	SEM
PsychSaf (Problem Solv)	Low	110	5.22	.70	.066
	High	89	5.52	.69	.073
PsychSaf (Decision)	Low	115	5.33	.70	.065
	High	83	5.39	.72	.079
PsychSaf (Personal Life	Low	125	5.22	.68	.061
	High	74	5.58	.69	.080

Table 4. Comparison of the lecturer authentic leadership between high and low-density networks

	Density	N	M	SD	SEM
Authentic Leadership (Problem Solving)	Low	110	2.71	.71	.068
	High	89	3.09	.46	.048
Authentic Leadership (Decision making)	Low	115	2.67	.69	.065
	High	83	3.18	.40	.044
Authentic Leadership (Personal Life)	Low	125	2.72	.69	.062
	High	74	3.16	.41	.048

Figure 1. A conceptual model of the relationship between authentic leadership, psychological safety, network density and academic performance**.**